

What is claimed is:

1 1. An angled tissue cutting instrument comprising
2 an elongate angled outer tubular member having a proximal end, a distal end, a
3 bend between said proximal end and said distal end, and an opening at said distal end
4 defining a cutting port; and
5 an elongate flexible inner tubular member rotatably disposed within said outer
6 tubular member to transmit torque in forward and reverse rotational directions, said
7 inner tubular member comprising an elongate inner tube of solid wall construction
8 having a proximal end and a distal end, a continuous helical cut formed in a stepped
9 pattern along a length portion of said inner tube corresponding to said bend, said helical
10 cut being formed in said inner tube at an angle in a first direction about said inner tube
11 to impart flexibility by which said inner tube conforms to said angled outer tubular
12 member while being rotated within said angled outer tubular member, a cutting
13 configuration carried at said distal end of said inner tube for exposure by said cutting
14 port to cut anatomical tissue when said inner tubular member is rotated within said
15 outer tubular member, and no more than a single layer of spiral wrap disposed over
16 said helical cut, said single layer of spiral wrap extending along said length portion at
17 said angle in a second direction, opposite said first direction, about said inner tube.

1 2. The angled tissue cutting instrument recited in claim 1 wherein said outer
2 tubular member is angled at a plurality of bends spaced along the length of said outer
3 tubular member.

1 3. The angled tissue cutting instrument recited in claim 2 wherein said
2 flexible inner tubular member comprises a plurality of said helical cuts formed in said
3 inner tube along a plurality of said length portions in correspondence with said plurality
4 of bends, respectively, and a plurality of said single layers of spiral wrap disposed over
5 said plurality of helical cuts, respectively, with said plurality of said single layers of spiral
6 wrap extending along said plurality of said length portions, respectively.

1 4. The angled tissue cutting instrument recited in claim 3 wherein said
2 plurality of bends extend in different directions and at different angles.

1 5. The angled tissue cutting instrument recited in claim 4 wherein said outer
2 tubular member includes a straight proximal length portion extending distally from said
3 proximal end of said outer tubular member to a proximal bend, a straight intermediate
4 length portion extending distally from said proximal bend to a distal bend, said proximal
5 bend being bent in a first direction at an angle of about 45 degrees to a central
6 longitudinal axis of said proximal length portion, said distal bend being bent in a second
7 direction opposite said first direction of said proximal bend, at an angle of about 15
8 degrees to a central longitudinal axis of said intermediate length portion.

1 6. The angled tissue cutting instrument recited in claim 1 wherein said single
2 layer of spiral wrap comprises a continuous strip of material spirally wound over said
3 inner tube.

1 7. The angled tissue cutting instrument recited in claim 1 wherein said helical
2 cut is formed in a stepped pattern comprising repeating interconnected steps.

1 8. The angled tissue cutting instrument recited in claim 7 wherein said steps
2 repeat at rotational intervals of about 100 degrees about said inner tube.

1 9. An angled tissue cutting instrument comprising
2 an elongate angled outer tubular member having a proximal end, a distal end, a
3 bend between said proximal end and said distal end, and an opening at said distal end
4 defining a cutting port; and
5 an elongate flexible inner tubular member rotatably disposed within said outer
6 tubular member to transmit torque in forward and reverse rotational directions, said
7 inner tubular member comprising an elongate inner tube of solid wall construction
8 having a distal end, a proximal end, a central longitudinal axis, an aspiration passage
9 through said inner tube, a continuous helical cut formed in a stepped pattern along a
10 length portion of said inner tube in correspondence with said bend to impart flexibility by
11 which said inner tube conforms to said angled outer tubular member while being rotated
12 within said outer tubular member, a cutting configuration carried by said distal end of
13 said inner tube for exposure by said cutting port to cut anatomical tissue when said
14 inner tube is rotated within said outer tubular member, an aspiration port at said distal
15 end of said inner tube establishing communication with said aspiration passage, and no
16 more than one layer of spiral wrap wound over said length portion, said stepped pattern
17 comprising repeating interconnected steps each made up of a transverse cut segment

18 extending transverse to the length of said inner tube in a first direction about said inner
19 tube and at an angle to a plane perpendicular to said central longitudinal axis, and a
20 longitudinal cut segment extending from said transverse cut segment along the length
21 of said inner tube, said spiral wrap being wound over said length portion in a second
22 direction, opposite said first direction, about said inner tube and at said angle to a plane
23 perpendicular to said central longitudinal axis.

1 10. The angled tissue cutting instrument recited in claim 9 wherein said angle
2 is about 20 degrees.

1 11. The angled tissue cutting instrument recited in claim 9 wherein said first
2 direction is a left hand direction about said central longitudinal axis and said second
3 direction is a right hand direction about said central longitudinal axis.

1 12. The angled tissue cutting instrument recited in claim 9 wherein said steps
2 repeat at rotational intervals of about 100 degrees about said central longitudinal axis.

1 13. The angled tissue cutting instrument recited in claim 9 wherein said
2 longitudinal cut segment has a length along said central longitudinal axis and said
3 transverse cut segment has a length transverse to said central longitudinal axis greater
4 than said length of said longitudinal cut segment.

1 14. A method of fabricating an angled tissue cutting instrument comprising

2 forming a continuous helical cut along a length portion of an elongate inner tube
3 at an angle in a first direction about said inner tube to impart flexibility along the length
4 portion, the inner tube being of solid wall construction prior to having the helical cut
5 formed therein and having an inner diameter the same size as the inner diameter of an
6 elongate inner tube forming the inner tubular member of a straight tissue cutting
7 instrument of the same diametric size as the angled tissue cutting instrument;

8 wrapping a continuous strip of material spirally over the helically cut length
9 portion of the inner tube at the angle in a second direction, opposite the first direction,
10 about the inner tube to form no more than a single layer of spiral wrap over the inner
11 tube;

12 securing opposing ends of the strip of material to the inner tube to form a flexible
13 inner tubular member having a flexible region along the length portion of the inner tube;
14 and

15 inserting the flexible inner tubular member for rotation within an angled outer
16 tubular member with the flexible region disposed within a bend in the outer tubular
17 member and a cutting configuration of the flexible inner tubular member exposed by a
18 cutting port in a distal end of the outer tubular member, the outer tubular member
19 having an outer diameter the same size as the outer diameter of a straight outer tubular
20 member of the straight tissue cutting instrument of the same diametric size as the
21 angled tissue cutting instrument.

1 15. The method recited in claim 14 wherein said step of forming includes
2 forming the helical cut in an elongate inner tube which may also be used as the inner

3 tubular member of the straight tissue cutting instrument of the same diametric size as
4 the angled tissue cutting instrument.

1 16. The method recited in claim 14 wherein said step of forming includes
2 forming the helical cut in a stepped pattern comprising repeating interconnected steps.

1 17. The method recited in claim 14 wherein said step of forming includes
2 forming the helical cut in an inner tube of a 2.9 mm angled tissue cutting instrument
3 using an inner tubular member having an inner diameter the same size as the inner
4 diameter of an inner tubular member of a 2.9 mm straight tissue cutting instrument.

1 18. The method recited in claim 14 wherein said step of forming includes
2 forming the helical cut in an inner tube of a 3.5 mm angled tissue cutting instrument
3 using an inner tube having an inner diameter the same size as the inner diameter of an
4 inner tubular member of a 3.5 mm straight tissue cutting instrument.

1 19. The method recited in claim 14 wherein said step of forming includes
2 forming the helical cut in an inner tube of a 4.0 mm angled tissue cutting instrument
3 using an inner tube having an inner diameter the same diametric size as the inner
4 diameter of an inner tubular member of a 4.0 mm straight tissue cutting instrument.

1 20. The method recited in claim 14 wherein said step of forming the helical
2 cut includes forming the helical cut at an angle of about 20 degrees in a left hand

3 direction and said step of wrapping includes wrapping the strip of material at an angle
4 of about 20 degrees in a right hand direction.

1 21. The method recited in claim 14 wherein said step of inserting includes
2 providing an annular clearance between the outer diameter of the flexible inner tubular
3 member and the inner diameter of the outer tubular member for the flow of irrigating
4 fluid along the angled tissue cutting instrument.

1 22. The method recited in claim 16 wherein said step of forming includes
2 forming the steps at rotational intervals of about 100 degrees about a central
3 longitudinal axis of the inner tube.